

Office Action Summary	Application No. 10/553,258	Applicant(s) NAKATA ET AL.	
	Examiner Julian D. Huffman	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31-38 and 40-45 is/are pending in the application.
- 4a) Of the above claim(s) 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 31-37 and 40-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>4/06/2010</u> . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12 February 2010 has been entered.

Election/Restrictions

Claim 38 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species/invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11 March 2009.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 31-37, 40-43 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimura.

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Sugimura discloses

Sugimura discloses:

With regards to claim 31, an image forming apparatus (fig. 8) comprising:

a carriage (203) having a recording head (101) that ejects droplets of liquid onto a recording medium for forming an image on the recording medium; and

a state detector (20) that detects presence of the recording medium along a moving line of said carriage,

wherein when moving said carriage in a main-scanning direction to perform a printing operation, a part of the printing operation is cancelled after said state detector detects non-presence of the recording medium [0012], and

wherein said state detector is provided on an upstream side of said carriage in a feed direction of the recording medium (fig. 8, element 20 is on an upstream side of the carriage), and the printing operation is started in a subsequent main scanning after said recording medium is conveyed and state detector detects an edge of the recording medium while scanning said carriage in the main-scanning direction in a current main-scanning, and a controller that receives detection information from said state detector when (language added from proposed amendment) said state detector detects the edge of the recording medium in the main scanning direction for a main-scanning of said carriage, and the controller determines therefrom [so as to determine] (changes from proposed amendment) a position of the edge of the recording medium used in the printing operation of a subsequent line (fig. 8, [0026], [0027], [0067], see response to arguments provided below).

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With regards to claims 32 and 33, the image forming apparatus as claimed in claim 31, wherein said state detector is provided on an upstream side of said carriage in the main-scanning direction so as to cancel the part of the printing operation in the main-scanning direction after a position where non-presence of the recording medium is detected by said state detector in an initial scanning of said carriage for printing (fig. 8).

With regards to claim 34, the image forming apparatus as claimed in claim 31, wherein a plurality of heads are provided in the recording head so as to eject droplets in a plurality of colors by being arranged in the main-scanning direction, and the main-scanning of said carriage is continued after non-presence of the recording medium is detected by said state detector so as to cancel a printing operation of each of the heads step-by-step while moving the carriage in the main-scanning direction (figs. 3, 4, 8, [0034], [0050], **[0067]**).

With regards to claim 35, the image forming apparatus as claimed in claim 34, wherein an amount of movement of said carriage in the main-scanning direction and cancellation of the printing operations of the heads step-by-step are controlled, after the non-presence of the recording paper is detected, in accordance with information regarding an adjustment value of intervals between the heads (dn, [0067]).

With regards to claim 36, the image forming apparatus as claimed in claim 31, wherein a plurality of nozzle trains are provided in the recording head so as to eject droplets in a plurality of colors by being arranged in the main-scanning direction, and the main-scanning of said carriage is continued after non-presence of the recording

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medium is detected by said state detector so as to cancel a printing operation of each of the nozzle trains step-by-step while moving the carriage in the main-scanning direction (fig. 8, [0067]).

With regards to claim 45, the state detector is provided on the upstream side of the carriage in the paper feed direction (fig. 8) to monitor a width of a printing line subsequent to the current printing line, so that the subsequent printing operation is performed based on the width determined in the previous printing operation ([0026] [0027]).

With regards to claim 40, (the image forming apparatus as claimed in claim 39), wherein a plurality of heads are provided in the recording head so as to eject droplets in a plurality of colors by being arranged in the main-scanning direction, and the main-scanning of said carriage is continued beyond the edge of the recording medium detected by said state detector so as to cancel the printing operation of the heads step-by-step (fig. 8, [0067]).

With regards to claim 41, (the image forming apparatus as claimed in claim 40), wherein an amount of movement of said carriage in the main-scanning direction and cancellation of the printing operations of the heads step-by-step are controlled, after each of said heads passes the edge of the recording medium, in accordance with information regarding an adjustment value of intervals between the heads (dn, fig. 8, [0067]).

With regards to claim 42, (the image forming apparatus as claimed in claim 39), wherein a plurality of nozzle trains are provided in the recording head so as to eject

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droplets in a plurality of colors by being arranged in the main-scanning direction, and the main-scanning of said carriage is continued beyond the edge of the recording medium detected by said state detector so as to cancel the printing operation of the nozzle trains step-by-step (fig. 8, [0067]).

With regards to claim 43, the image forming apparatus as claimed in claim 39, wherein said state detector is provided at a position corresponding to the nozzle train closest to an edge off said recording head in the main-scanning direction (fig. 8).

With regards to claims 31, 33 and 39, Sugimura discloses everything claimed with the exception of detecting the recording medium for each main-scanning. Sugimura states that the detection is performed "for every several scans" [0064].

However, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify Sugimura so as to perform the detection for each scan for the purpose of more accurately detecting the skew of the print medium [0021].

With regards to claim 37, Sugimura does not disclose bidirectional printing and when a part of the printing operation in one direction is cancelled, a part of the printing operation corresponding to an area where the printing operation is cancelled in the one direction is also cancelled in the printing operation in the other direction.

However the examiner takes official notice that bi-directional printing is well known in the art.

It would have been obvious to one having ordinary skill in the art at the time of the invention to incorporate bidirectional printing in Sugimura and to control the device such that when a part of the printing operation in one direction is cancelled, a part of the

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printing operation corresponding to an area where the printing operation is cancelled in one direction is also cancelled in the printing direction in the other direction so as to improve the printing speed while preventing ink from staining the printing device.

One of ordinary skill in the art, in incorporating bidirectional printing into Sugimura, would have utilized the detection results to control printing in both directions by simple modifications so as to continue to realize the benefits of Sugimura with the added benefit of bidirectional printing.

Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimura in view of Maki et al. (U.S. 20020126193).

With regards to claim 44, Sugimura does not disclose an electrostatic conveyance belt conveying the printing medium.

However, Maki et al. discloses an electrostatic conveyance belt (abstract).

It would have been obvious to one having ordinary skill in the art at the time of the invention to incorporate an electrostatic belt feeder into Sugimura for the purpose of more stably conveying the printing medium.

Response to Arguments

Applicant's arguments have been fully considered and the claims have been interpreted in light of the claim language discussed in the interview (please see the attached interview summary). However, the arguments are not deemed to be persuasive.

The applicant argues that Sugimura does not disclose that the state detector is provided on an upstream side of said carriage in a feed direction of the recording medium, and the printing operation is started in a subsequent main scanning after said recording medium is conveyed and said state detector detects an edge of the recording medium while scanning said carriage in the main-scanning direction in a current main-scanning.

As shown in fig. 8, the detector 20 is provided on the upstream side of the carriage in a feed direction.

The applicant discusses Sugimura and argues that “when the recording paper P is detected by the sensor 20, the recording paper P is moved rearward once and printing is performed by the ink head 101 with consideration of a time lag due to a distance d2 between the center of the sensor 20 and the edge of the inkjet heads 101”.

Based on this interpretation of Sugimura, the applicant maintains that Sugimura does not disclose or suggest detecting an edge of a recording medium during a current main-scanning for a printing operation at the current line, for control of a subsequent main-scanning for a printing operation at a *subsequent* line (that is, next line after the line being printed by the inkjet head 101).

The examiner disagrees with the applicant’s statement that “when the recording paper P is detected by the sensor 20, the recording paper P is moved rearward once”.

Sugiyama states that "If the record paper P is conveyed and the record paper P is detected by the sensor 20, in consideration of the time lag by the distance d2 of the

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center position of the sensor 20, and the end of the ink head 101, the record paper P will once retreat and will be printed by the ink head 101" [0067].

This language is from a machine translation of Sugiyama.

The applicant further argues that "While Fig. 8 of Sugimura shows the sensor 20 being located at a position different from a position of the ink head 101 in the paper conveyance direction, detection of the paper edge by the sensor 20 is for control of the printing of the current line. As a consequence, if the paper is in an irregular size, especially, if the paper width at the position of the ink head 101 is smaller than a paper width at the position of the sensor 20, ink is discharged from the ink head 101 at a paper edge detected by the sensor 20, which results in the ink being discharged out of the paper. Sugimura fails to appreciate such problem."

As the examiner understands the invention, the sensor is upstream from the heads by a distance d_2 . Therefore, a region of the paper that is detected by the sensor 20 only reaches the recording region of the heads 101 after feeding of the paper in the downstream/forward/feed direction. Thus, since Sugimura considers the distance d_2 between the sensor and the head, and then feeds the paper so that it can be printed by the head, the examiner maintains that Sugiyama detects the edge of the medium for a subsequent line and determines the edge therefrom for the printing of this subsequent line.

Therefore, since Sugimura considers the time lag by the distance d_2 , Sugimura does not use the current detected position of the sensor, which is different from a

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position of the head, to control the printing of the current line. Rather, Sugimura considers the distance d_2 between the head and the sensor and feeds the paper such that while the printhead prints on a first region of the paper, a second region is being detected by the sensor, and then the paper is fed such that the second region is over the printhead and printing is conducted on the second region based on the prior results sensed by the sensor when it was over the second region, such that the controller receives detection information from the state detector when the state detector detects the edge of the medium in the main-scanning direction for the main scanning and determines therefrom the position of the edge of the recording medium for the printing operation of a subsequent line.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian D. Huffman whose telephone number is (571) 272-2147. The examiner can normally be reached on 10:00a.m.-6:30p.m. Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Julian D. Huffman/
Primary Examiner, Art Unit 2853